

## Optimized Patient Transfer through Innovative Multidisciplinary Assessment: Project Description of Phase I [Translated from the original article in German published in *Pflegewissenschaft* 2012; 5:291-8]

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### Abstract

**Introduction:** OPTIMA is a multi-professional quality management and research project, conducted at the Cantonal Hospital of Aarau (KSA), Switzerland in cooperation with post-acute care institutions from November 2009 until December 2012.

**Objective:** The goal of this study was to optimize patient care pathways and to provide patient-centered, cost-effective care that is conform with the introduction of the Diagnosis Related Groups (DRG) in 2012.

**Methods:** The "Post-Acute Care Discharge Scores" (PACD) was applied to assess the risk for transfer to post-acute care facilities in 240 patients suffering from lower respiratory tract infections during the first phase of the study (OPTIMA I) from October 2009 until April 2010. In order to assess the patients' self-care ability, the "Self-Care Index" (SPI) tool was applied on admission and during the course of inpatient treatment.

**Results:** The PACD predicted that 55% of patients (N=202) were at medium to high risk of requiring post-acute care. According to the SPI, 38% of patients (N=217) showed reduced ability to care for themselves. The discharge of 69% of medically stable patients (N=43) was postponed due to shortage of beds in post-acute care facilities. Correspondingly, 62% of the medically stable patients (N=141) could imagine receiving post-acute care in a "Nurse-led Unit" (NLU). Despite being medically stable, one third of the patients (N=124) was not ready to return to their homes because they felt too weak or insecure to cope with everyday life.

**Conclusion:** Using standardized tools to predict patients at risk for transfer to post-acute care facilities and reduced self-care abilities and the continuous evaluation of medical stability are all methods that could be applied to enhance interdisciplinary care and optimize discharge management. Furthermore, setting up NLU is expected to unburden the occupancy of acute care beds by a considerable amount of patients who are in need of post-acute care.

**Keywords:** Post-acute care needs; Triage; Discharge planning; Patient care pathways

### Introduction

Based on demographic data, an increase in the number of elderly persons in the population has been estimated [1]. Getting old is often associated with age-related chronic diseases and an increased need for nursing care and support [2]. Furthermore, a change in social conditions is also expected because many significant others might be occupied and therefore have less or no time to take part in the care of the elderly person [1]. Consequently, an increased hospitalization rate can be observed in elder people who are at low medical risk for severe disease progression and are mainly admitted because they require nursing care or due to psychosocial reasons [3,4]. With the limited bed capacity in central hospitals, the admission of such patients affects the hospital infrastructure and leads to shortages in human resources. Consequently, the capacity for receiving severely ill patients in need of immediate care would be restricted. This kind of shortage is mostly seen during the winter months with the increased number of patients suffering from lower respiratory tract infections and need to be hospitalized [5,6]. For this reason, it is essential that health care professionals develop strategies to provide resource-oriented, cost-effective and high quality treatment adapted to suit the medical and the nursing risk factors of the patient. In this regard, a better understanding of the individual needs of patients seeking medical or nursing care in a central hospital is worthwhile.

In order to meet these requirements, the Cantonal Hospital of Aarau (KSA) – a central hospital for maximum care, developed such strategies as part of the OPTIMA (Optimized patient transfer through innovative multidisciplinary assessment) project in collaboration with the partner institutions Klinik Barmelweid and aarReha Schinznach (both are rehabilitation institutions) and the Department of Health and Social Services of the canton Aargau (November 2009 until December 2012). Within the framework of the OPTIMA project, structured pathways for optimal patient transfer to post-acute care facilities and patients' triage have been developed and conducted in phases. For the successful development of these pathways, interdisciplinary collaborations between physicians, nurses, social workers, patients, the hospital environment and the canton were fundamental. The OPTIMA project has been planned and implemented as a multi-professional approach

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right from the beginning. This allowed for synergies to be utilized and for setting positive signals to employ profession-related resources and areas of expertise. The multi-professional cooperation is expected to benefit the patients, their relatives and the health care system in general. Additionally, OPTIMA was carried out in a trans-institutional approach, i.e., actively involving institutions that provide post-acute medical and nursing care alongside the KSA. In order to grant patients with lower respiratory tract infections access to rehabilitation services specific to their disease [7], post-acute care was coordinated with two rehabilitation institutions where this option was incorporated.

The main goals of OPTIMA were defined as follows:

- Optimizing diagnosis-related patient pathways during hospitalization and after discharge with follow-up care
- Ensuring continuous, trans-institutional, patient-centered and cost-efficient treatment and nursing care
- Setting up a “Nurse-led unit”, (NLU) that complements the existing treatment options within the KSA
- Enhancing and preserving knowledge and skills of people involved in the treatment and care, namely healthcare professionals, patients and significant others.

OPTIMA encompasses three sub-projects:

1. Research (OPTIMA (I-III))
2. Instruction/training of all involved services regarding instrument utilization
3. Setting up nurse led unit (NLU) within the acute care hospital (Project phase OPTIMA (I-III))

The three aforementioned sub-projects are carried out simultaneously with the aim of continuously integrating the acquired knowledge and insights in the process.

### Subproject research (OPTIMA Phase I)

**The nursing-related aspects:** To prepare for a structured patient transfer based on the risk status of transfer to a post-acute care facility, the actual patient flow from the time of admission to the emergency department until the discharge home or the transfer to a post-acute care institution was assessed and documented. Thus, the main goal of phase I was to analyze the transfer of patients to virtual care facilities retrospectively. In other words, an optimized triage for patients with lower respiratory tract infections was tested on paper at the time of admission to the emergency department. With the help of medical and nursing assessment instruments, the medical conditions of eligible patients were categorized into medically non-acute, acute or very acute; require nursing care or does not require nursing care. Based on the aforementioned assessment, the research team assigned patients virtually to inpatient or outpatient treatment and to discharge home (without help) or transfer to a post-acute-care facility (rehabilitation clinic or outpatient nursing services). A further goal of this phase was to apply medical and nursing assessment to investigate the predictive power to estimate the severity of disease. Furthermore, this phase was expected to provide information about the practical feasibility of the assessment instruments and to illustrate possible criteria for adjustment.

### Ethical considerations

The ethics commission of the canton Aargau approved for the data

collection to be carried out within the framework of a quality assurance project.

### Methods

A total number of 253 patients with non-nosocomial lower respiratory tract infections were included in the interdisciplinary research project in the emergency department of the KSA between November 2009 and April 2010 [8].

Inclusion criteria:

- Diagnosed with lower respiratory tract infection
- Age  $\geq$  18 years.

A total of 13 patients (5%) exhibited cognitive disabilities, refused to take part on the interview and/or had insufficient command of the German language and therefore were excluded from the interviews. The remaining 240 patients who met the inclusion criteria were informed about the OPTIMA project by the attending physician (when possible during the patient's stay in the emergency department). They also received an information sheet containing the most important facts about the project.

To estimate the risk for post-acute nursing care needs, a standardized questionnaire (post-acute care discharge scores=PACD) was used to assess the patients' home situation. This was done either by the emergency department staff or retrospectively by members of the research team if the patient was already transferred to the ward. The PACD was adopted from Simonet et al. [9] and was applied at day one and day four of patient's admission to the hospital. The original PACD showed good predictive abilities on day one and day three (AUC: 0.81 respectively 0.82). Values of  $\geq$  8 at day three showed a sensitivity of 87% and a specificity of 63%. The PACD was translated from French to German by the research team.

In order to select the most suitable instrument for the study purpose, the PACD and Rowland score [10] were tested on 10 pilot patients for comprehensibility and clinical practicability. The Rowland score contained questions about the current use of aids or support for mobility and/or transfer, clothing, managing finances, shopping, visits to outpatient clinics, receiving meals from a meal delivery service and/or receiving help from another person at home. After the simultaneous testing of the two instruments, the PACD has been selected and linguistically adapted to assess the risk for post-acute care needs.

The PACD at admission contained questions that involved the number of active health problems at the time of admission (one point for each affected organ system; two points for respiratory tract infection, one point for the organ system and one point for the infectious disease), age (1 point for every 10 years of age starting at the age of 60) and activities of daily living and instrumental activities that were restricted during the last two weeks. Moreover, one additional point was added for each activity which could not be performed independently and four points were given when no significant other was available to provide support at home and two points were added for each patient transfer within the hospital.

Patients who scored less than 8 points on the PACD were considered at low risk for requiring post-acute care. A score of 8-15 points was considered as medium risk and more than 15 points was considered a high risk for requiring post-acute care.

The self-care index (SPI) was used to assess the degree of patients' self-care. The SPI has been chosen because of its advantage as resource-oriented rather than deficit-oriented instrument.

Using the nursing documentation, the research team assessed the patients' self-care ability at admission (when possible during the patient's stay in the emergency department), at day one to day four of hospitalization and subsequently every three days. The acquired information was checked by the responsible nurse and corrected correspondingly.

The SPI contained four answer categories for each of a total of ten items: mobility, personal hygiene, dressing and undressing, eating and drinking, elimination and cognition. The categories were dependent (=1 point), requires extensive support (=2 points), requires minor support (=3 points) and independent (=4 points) creating a possible range of 10-40 points where 40 points correspond to completely independent. The cut-off point for the risk for post-acute care deficit was defined at <32 points. The SPI reached a sensitivity of 81% and a specificity of 94% in a study conducted in Germany [11].

After reaching medical stability, patients were interviewed regarding their current care needs (based on the SPI scores), the available support at home, fears and information needs. To evaluate patient's willingness to receive health care while in the hospital without the daily physician visits the following question was asked: "Your condition is now medically stable. This means that you could theoretically be discharged from the hospital. Could you imagine: a) Going home now (answer: yes, no); b) or going to a ward with daily rounds and visits by a nurse instead of a physician (answer: yes, no)?"

One month after patient admission to the emergency department, a telephone interview was conducted retrospectively by the research team to evaluate the patients' real need for support and their actual need for information.

An oral consent for the telephone interview was obtained during the patients' hospital stay.

## Results

Demographic data showed that more than half of the patients (55%) were men with a median age of 67 years (interquartile range: 23 years). The majority of the patients were diagnosed with Pneumonia (67%), 19% with Chronic Obstructive Pulmonary Disease (COPD) and 14% with Bronchitis. The median for active medical problems was 3 (Modus 2; range: 2-11). Regarding living conditions prior to hospital admission, 61% (N=132) lived with a partner who was able to support them, 16% (N=34) lived alone, 12% (N=25) lived in a nursing home and 11% (N=26) reported another form of accommodation (Total N=217).

Furthermore, 40% of the patients needed help during the last two weeks prior to seeking the emergency department. Almost two third of the patients (62%; N=54) needed help with their housekeeping, 45-46% (N=30-40) needed support with their medication, personal hygiene, showering/bathing, shopping and change of location, and 38-42% (N=33-36) needed support with cooking and changing clothes. Another 14-25% (N=12-22) required support with elimination and walking or transfer from bed to a chair (Total N=87). Nursing care services at home were used by 11% of the patients (N=24) while 6% (N=13) received help with their housework and 3% (N=8) made use of a meal delivery service (Total N=217).

### Assessment of the risk for post-acute care needs

The PACD results showed a median of 8 points on the day of admission (1. Quartile=6; 3. Quartile=10, Modus=6). The level of risk and the transfer to a post-acute care institution were related (Tables 1 and 2). On the other hand, the self-care index (SPI) presented a median

Low	Medium	High
91 (45%)	101 (50%)	10 (5%)
Definition of risk: low <8, medium 8-15; high >15 points		

Table 1: Prevalence of the risk for post-acute care needs at day 1 (PACD, N=202).

Exact test, p<0.001	Low	Medium	High	Total
Home	80	63	3	146
Post-acute institution	6	24	4	34
Total	86	87	7	180

Table 2: Risk for post-acute care needs and transfer destination (N=180).

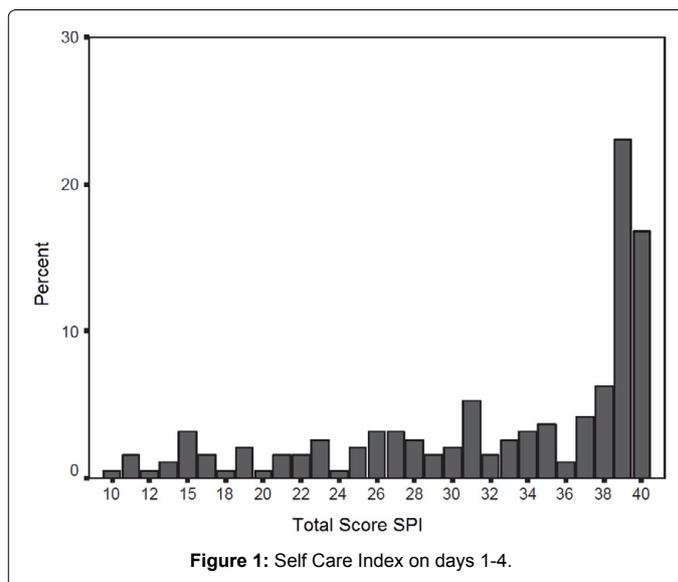


Figure 1: Self Care Index on days 1-4.

Low risk ≥ 32	High risk <32
62%	38%

Table 3: Distribution of risk for post-acute care deficit according to the SPI (N=217).

of 37 (Modus=39) from day one to day four. A large dispersion of values could be observed (1. Quartile=27, 3. Quartile=39) (Figure 1). The risk for post-acute care deficit using the SPI was observed in about one third of the patients (Table 3).

The physicians who attended the patients and were familiar with the project assessed the patients on a daily basis with regard to their medical stability. As soon as medical stability was reached, reasons for a further stay in the hospital were evaluated (Table 4) and nursing care needs were discerned (Tables 5 and 6). Only the main reason could be stated at one point in time. However, the reasons could be repeated during the course of hospitalisation.

More than half of the medically stable patients receiving inpatient care (62%) (Total N=141) could imagine receiving care at a NLU and 73% of the patients who could not imagine going home at the time of the interview (Total N=55) could imagine receiving care at a NLU.

The variation in the number of patients (N) throughout the data could be attributed to the missing answers to some of the questions. Having a person available at all times or living in the same household was infrequently stated as a prerequisite for discharge. Several criteria were reported by the patient when they were asked about other prerequisites for going home after reaching medical stability (Table 6).

Figure 2 shows the number of patients who confirmed or denied feeling afraid to go home upon having reached medical stability.

	Intensive nursing care: dementia, delirium, falls, decubitus ulcer	Waiting for a temporary care / place in rehabilitation institution / place in nursing homes / nursing care services at home	Therapy related to reduced mobility and/or self-care	Other reasons
Day 1-3	0	8	4	0
Day 4-6	2	14	5	1
Day 9-11	3	10	3	1
Day 16-19	0	9	1	0
Day 2-0 before admission	0	3	0	0
Total	5	44	13	2
%	8%	69%	20%	3%

**Table 4:** Organizational and nursing care-related reasons for hospitalization after having reached medical stability.

<b>Requirements covered by the help of significant others:</b> <ul style="list-style-type: none"> <li>Housekeeping</li> <li>Preparation and administration of medicine</li> <li>Mobilization</li> <li>Personal hygiene</li> <li>Getting dressed, elimination</li> </ul>	13% 12% 11% 9% 4%
<b>Requirements not adequately covered:</b> <ul style="list-style-type: none"> <li>Personal hygiene, getting dressed, elimination, eating, housekeeping</li> <li>Mobilization, climbing the stairs</li> </ul>	1-3% 4-6%

**Table 5:** Nursing care needs at the point of medical stability (N=138).

Health condition	<ul style="list-style-type: none"> <li>Reaching two thirds of recovery, completely recovered</li> <li>Feeling secure, feeling relatively healthy</li> <li>Regaining strength, can walk 100m, can walk normally without assistance</li> <li>Improved ability to climb the stairs, feeling less weak</li> </ul>
Discharge planning	<ul style="list-style-type: none"> <li>Early planning to be well-prepared for the discharge</li> </ul>
Information	<ul style="list-style-type: none"> <li>Specific and accurate information from the physician, therapy plan (including instructions, e.g. climbing the stairs, avoiding over- or under exertion)</li> <li>Want to talk to the physician about what comes next</li> <li>Social information regarding possible support e.g. assistance with housekeeping</li> <li>Confirmation of receiving the income replacement insurance</li> </ul>
Organizing auxiliary aids	<ul style="list-style-type: none"> <li>Organizing a walking frame</li> <li>Organizing an inhalation device, oxygen (stated twice)</li> </ul>
Organization / involvement of home care nursing services	<ul style="list-style-type: none"> <li>Home care nursing services for intravenous antibiotic therapy (stated twice)</li> <li>The apartment is tidy thanks to home nursing</li> </ul>
Contact	<ul style="list-style-type: none"> <li>Contact person at the KSA (telephone contact)</li> <li>List of medications, wants to be asked how she/ he is doing every two weeks to gain a sense of security</li> </ul>
Rest and relief	<ul style="list-style-type: none"> <li>Now she needs rest and relief from the burden of household chores, help from the parents</li> <li>Rest and quietness, because the kids at home are also a disturbance at night</li> </ul>

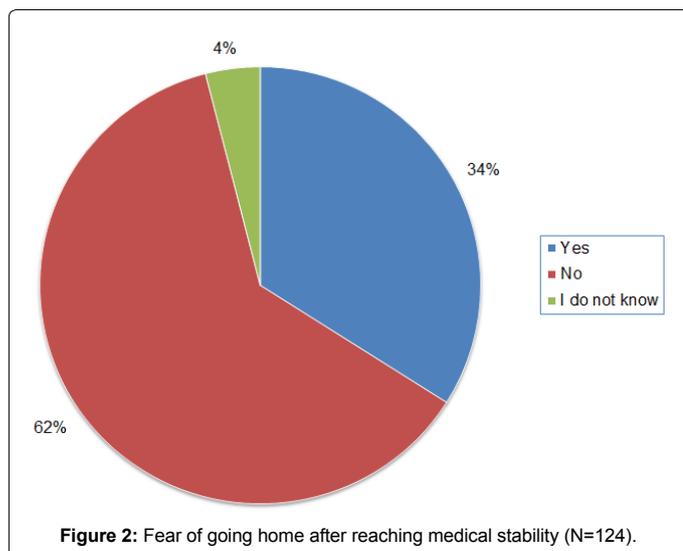
**Table 6:** Conditions stated for a discharge home after reaching medical stability (N=31, single references, if not stated otherwise).

Category	Number	Quotation
Fear of relapse/ deterioration of the condition Shortness of breath / difficulty breathing / feeling of suffocation	23	"not risking a relapse" "shortness of breath, if it would increase again" "fear of feeling almost suffocating"
Subjectively bad health condition Feeling weak	25	"still very sick /weak" "not yet healthy" "not feeling secure"
Insufficient mobility / fall	9	"not steady on the feet" "not being able to walk" "fear of falls"
Living alone	3	"no one home" "feeling insecure"
Therapy / care needs, supervision	12	"oxygen, medication, therapy" "do something wrong" "lack of professional advice"

**Table 7:** Patient statements regarding fear after reaching medical stability (N=44).

Patients who confirmed being afraid to go home upon reaching medical stability were asked about their reasons (Table 7). At the point of reaching medical stability, 28% of the patients (N=44) reported a need for knowledge in various areas (N=138). The topics for which patients

mostly wished an educative intervention included: Medication, Therapy plan/ breathing exercises, symptom control, behavioral instructions/ organizing daily life, explanations concerning the disease, explanations concerning the diagnosis and the medical examinations, questions



pertaining to financial and social insurance matters, instructions regarding oxygen administration at home and the regulation of blood sugar levels, preventive measures and follow-up care.

At the point of medical stability, 42% of the patients could not be interviewed (N=102). This was for example the case, if the patient was discharged earlier than planned so the research team could not contact the patient anymore. Moreover, 17% of the patients (N=40) could not be assessed 30 days after being included in the quality assurance project. From those patients who took part in the telephone interview 30 days later, 16% (N=28) still wished for more information, instruction and participation when looking back at their hospital stay (N=173).

For the majority of the interviewed patients (84%; N=178), the time of hospital discharge was appropriate. However, 14% (N=24) who answered the same question 30 days after admission to the emergency department, felt that they had been discharged too early from the hospital. At the point of reaching medical stability, 56% (N=75) could imagine going home (N=130). On the other hand, after 30 days of admission, 20% of the patients stated feeling insecure when they were discharged home (Total N=171).

## Discussion

The standardized and systematic assessment was able to identify post-acute care needs in patients hospitalized for lower respiratory tract infections. More than half of the patients showed assessed by the PACD a risk for post-acute care needs, while in one third of the patients self-care deficit was identified using the SPI.

So far, the Barthel-Index [12] has been used to assess patients with self-care deficit within the first three days of admission. The status of these patients was then discussed on the ward rounds, where the known social conditions of the patient and the already organized supportive measures were clarified as part of the discharge plan. The ward physician and the nurse were responsible for estimating the expected course of the patient condition during hospitalization. This on turn affected the discharge planning which was based on the good judgement and experience of the clinical staff.

Although the PACD was basically developed to measure the risk for post-acute care needs in general medical patients on the ward, it also worked in patients with lower respiratory tract infections in the emergency department.

More than one half of the medically stable patients could imagine being admitted to a nurse led unit (NLU). This might be attributed to open-mindedness on the side of the patients to try out something new. It might also denote that most of the patients have confidence in the professional nursing care. This confidence in the nursing staff could be attributed to the positive experience developed during hospitalization in the course of received nursing care or it could be based on past experiences. Therefore, setting up a NLU would represent the interest and needs of patients. Moreover, the high approval of NLU post-acute care within the hospital might be attributed to a shift in patients' priority from medical diagnosis and therapy during the acute phase of care to physical-psycho-social support in the activities of daily life during the medical stability phase.

One third of the patients who were considered medically stable felt afraid regarding their discharge home. Results showing patients' statements regarding fear revealed that even after receiving successful medical treatment, patient with lower respiratory tract infections still remain physically feeble. Moreover, experiencing shortness of breath during the course of the disease is perceived as existential threat to the patients which could justify the fear of discharge. Patients could experience shortness of breath not only at the beginning of the disease, but during the course of the disease as well. The degree of difficulty in breathing could vary depending on the patient.

Furthermore, patients revealed their need for instructions and preparations for discharge which on one hand belongs to the nursing competencies and on the other hand could be greater during the post-acute phase than during the acute phase. The most prevalent reasons for delayed discharge was shown in more than two thirds of the patients who were medically stable and yet had to wait for a vacant place in a post-acute care facility. This might be attributed to a supply-demand imbalance or it could be due to organizational factors (for example late application). Therefore, preventing bio-psycho-socially complicated scenarios using strategies such as the NLU is imperative to reduce the length of hospital stay in the future.

The majority of the patients were comorbid with persisting illnesses that might still have negatively affected their health even after the stabilization of breathing. Therefore, an early discharge planning not only prepares the patients psychologically, but also increases the readiness for discharge upon reaching medical stability. Early discharge planning was successfully implemented in other groups of patients like for example psycho-oncology or cardiac rehabilitation.

## Limitations of the Study

There are various limitations of the OPTIMA Phase I. Eleven (5%) of the possible patients with lower respiratory tract infections at the time of hospital admission could not be interviewed (N=240). This was due to strong shortness of breath, the necessity of an intensive care treatment to support breathing or the wish not to be interviewed which might be expected in the acute phase of the disease. Furthermore, data could not be fully collected from all patients. This was mostly due to an early and unforeseeable discharge of the patients, for example in patients who medically recovered very fast. However, it could be presumed that these patients were highly independent and were therefore neglected in the assessment of the risk for post-acute care needs. The sample of the examined patients included patients with a medium disease severity, i.e. patients who achieved medical stability after a few days (as opposed to patients needing intensive care treatment), but who were very likely to need post-acute care.

The answers of the patients concerning their readiness for further care on a NLU must be viewed critically due to the possibility of the

influence of social desirability. It is possible that patients were being polite and did not want to hurt the nursing staff. Although the patients consented to be introduced to the NLU, it is possible that it was because they did not have a clear idea about how exactly a NLU would be like. Moreover, the consent of the patients would not have any real consequences because the NLU had not yet existed.

## Conclusion

The study shows that the majority of patients who were admitted to the participating institutions between October 2009 and April 2010 and suffered from lower respiratory tract infections showed a risk for post-acute care needs. In the light of the demographic prognosis illustrated at the beginning of this work, the need for nursing care in our society is increasing. The institutions involved in the provision of healthcare (hospital management, institutions offering post-acute care, outpatient nursing services, health insurances, health departments and politics) are called upon to create solutions for this challenge.

The reasons that led to many of the medically stable patients' delayed discharges while waiting for vacant places in a post-acute care institution point out the need for improving the process of triage and interdisciplinary discharge planning. The standardized, systematic utilization of suitable interdisciplinary instruments at an early stage and a continuous cooperation with post-acute care facilities is important and must include the participation of patients and their relatives [13,14]. This is indispensable for shortening the period of occupancy and to prevent shortages in acute care beds. Efforts have been made at the KSA to accelerate the patient processes in order to keep up with the services connected to some diagnosis groups that are being reimbursed on a flat rate per case in the canton of Aargau. The optimization of the bed occupancy in Swiss hospitals is especially relevant in view of the application of the SwissDRG in January 2012.

The implementation of NLU could disburden the area of acute medical care and acute nursing care by directly transferring medically stable patients from the emergency department or the acute care ward to this post-acute care unit. The study showed that patients would generally welcome a ward primarily led by nursing staff. Next to conditions relating to financial, structural and human resources, patients' acceptance is an important factor for the successful establishment of such a unit.

It is crucial that nurses working on a NLU have strong and reflective skills regarding patient education. The study results show that in many cases patients do not feel secure nor physically stable for discharge. Therefore, carefully selected measures that focus on life at home should be identified and implemented in the NLU. In order to achieve this, nurses are to give goal-oriented, appropriate care and support to the patients. Having the focus shifted from acute care, self-management and daily life management should be emphasized. Important elements of post-acute care include activities of strength development, coordination, general improvement of the health condition and nutritional status and establishing a feeling of security in performing activities of daily life. This could be deduced from patients' statements regarding the subject of fear related to discharge. In order to ensure patient safety and quality of care, it is desirable and advisable that the NLU nurses are supported by an experienced nurse with in-depth knowledge, expertise and education. Depending on the size of the ward and the number of beds, the number of comprehensively trained nurses must be reviewed critically and adjusted accordingly.

## Recommendation

Based on the findings of the study, the following recommendations can be:

- Conducting the process of triage within the first 24 hours of admission, ideally while the patient is still in the emergency department, and during the course of hospital stay using the PACD and the SPI.
- Further reinforcement of the interdisciplinary collaboration between physicians, nurses and members of the social service in order to optimize the discharge planning and to strengthen this collaboration through relevant measures on the managerial level.
- Setting up a NLU/ nurse led care (NLC).
- Preparation and continuous training of NLU nurses with regard to discharge planning, patient education and patient self-management.

The data collected with the help of the PACD will be systematically integrated in the assessment of patients during the second phase of the OPTIMA project, lending it a greater weight. The PACD and the SPI will be actively used for the triage of patients in the emergency department and the discharge planning on the hospital wards. This will promote close interdisciplinary collaboration between physicians and nurses. The NLU which is primarily under the responsibility and supervision of nurses has been established.

The implementation of the practical recommendations will be under scientific guidance and evaluation. As a next step, the assessment instruments used in this study will be utilized in other patient groups (e.g. patients with heart failure, urinary tract infections, syncope and falls). At the same time, the NLU will also be available for patients with other diagnoses at admission. The ultimate goal is to facilitate the necessary conditions for a generally accepted guideline to optimize patient processes inside the medical departments and within the hospital. Finally, the predictive power, specificity and sensitivity of the instruments (in German language) used for patients with pulmonary diseases and other diseases will be scientifically validated.

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